

IN THE CLAIMS

Please cancel claims 1-17 without prejudice and add the following claims:

1-17. (Canceled)

18. (New) A method for separating squalenes, carotenes, tocopherols, and sterols from a vegetable oil under isocratic conditions, comprising the steps of:

- a) esterifying the vegetable oil with an alcohol to provide a first mixture comprising glycerol, fatty acid esters, and the squalenes, carotenes, tocopherols, and sterols;
- b) separating the glycerol from the fatty acids and the squalenes, carotenes, tocopherols, and sterols to provide a second mixture comprising the fatty acids and the squalenes, carotenes, tocopherols, and sterols;
- c) distilling the second mixture at a temperature ranging from room temperature to 200°C and a pressure ranging from 0 to 150 mm Torr to provide a concentrate comprising squalenes, carotenes, tocopherols and sterols;
- d) diluting the concentrate in a non-polar solvent or a mixture of non-polar solvent and a polar solvent wherein the ratio of non-polar solvent to polar solvent ranges from 90:10 to 99.5:0.5;
- e) adsorbing the squalenes, carotenes, tocopherols, and sterols in the diluted concentrate obtained in step (d) on an adsorbent;
- f) desorbing the minor components from the adsorbent at a pressure from 0.2 to 50 bar using a non-polar solvent or a mixture of non-polar solvent and a polar solvent wherein the ratio of the non-polar solvent to the polar solvent ranges from 90:10 to 99.5:0.5 to provide the squalenes, carotenes, tocopherols, and sterols.

19. (New) The method of claim 18, wherein the vegetable oil is palm oil.

20. (New) The method of claim 18, wherein the alcohol used in step (a) is selected from the group consisting of methanol, ethanol, iso-propanol, and butanol.

21. (New) The method of claim 18, wherein the adsorbents used in step (e) is selected the group consisting of normal-phase silica gel, reversed-phase silica gel, neutral alumina, and polymer adsorbents.

22. (New) The method of claim 18, wherein the non-polar solvent selected from the group consisting of hexane, heptane, dichloromethane, cyclohexane, petroleum ether, ethyl acetate, isooctane, and cyclohexane.

23. (New) The method of claim 18, wherein the polar solvent selected from the group consisting of ethanol, isopropanol, methanol, butanol or acetonitrile.

24. (New) A method for separating individual carotenes, individual tocots, or individual sterols from vegetable oil comprising the steps of

- a) adsorbing vegetable oil on an adsorbent; and
- b) desorbing the individual carotenes, tocots, and sterols from the adsorbent using a mixture of polar and non-polar solvents;

wherein steps (a) and (b) are performed under isocratic and isobaric conditions at a pressure ranging from 0.2 - 1000 bar.

25. (New) The method of claim 24, further comprising concentrating the vegetable oil or obtaining a phytonutrients rich-fraction from vegetable oil.

26. (New) The method of claim 24, wherein the vegetable oil is palm oil.

27. (New) The method of claim 24, wherein the adsorbent is selected from the group consisting of normal phase silica gel, reversed-phase silica gel, neutral alumina, and polymer adsorbents.

28. (New) The method of claim 24, wherein the non-polar solvent is selected from the group consisting of hexane, heptane, ethyl acetate, isooctane, and cyclohexane.

29. (New) The method of claim 24, wherein the polar solvent is selected from the group consisting of ethanol, iso-propanol, methanol, and butanol.

30. (New) A method for isolating individual carotenes, individual tocots, and individual sterols from a mixture comprising squalenes, carotenes, tocots, and sterols comprising the steps of:

- a) esterifying the mixture with an alcohol to provide a second mixture comprising glycerol, fatty acids esters, and the individual carotenes, individual tocots, and individual sterols;
- b) separating the glycerol from the second mixture to provide a third mixture comprising the fatty acid esters and the individual carotenes, individual tocots, and individual sterols;
- c) distilling the third mixture at a temperature ranging from room temperature to 200°C and a pressure ranging from 0 to 150 mm Torr to provide a concentrate comprising squalenes, carotenes, tocots, and sterols;
- d) diluting the concentrate in a non-polar solvent or a mixture of a non-polar solvent and a polar solvent wherein the ratio of the non-polar solvent to the polar solvent ranges from 90:10 to 99.5:0.5;
- e) adsorbing the individual carotenes, individual tocots, and individual sterols of the concentrate obtained from step (d) on an adsorbent;
- f) desorbing the individual carotenes, individual tocots, and individual sterols from the adsorbent at a pressure from 0.2 to 50 bar using a non-polar solvent or a mixture of a non-polar solvent and a polar solvent wherein the ratio of the non-polar solvent to the polar solvent ranges from 90:10 to 99.5:0.5 to provide a fraction containing the individual carotenes, a fraction containing the individual tocots, and a fraction containing the individual sterols;
- g) obtaining individual carotenes, individual tocots, or individual sterols by absorbing the fraction containing the individual carotenes, the fraction containing the individual tocots, or the fraction containing the individual sterols on a second absorbent and desorbing the individual carotenes, individual tocots, or individual sterols from the second absorbent using a mixture of polar and non-polar solvents, wherein the absorbing and

desorbing are performed under isocratic and isobaric conditions at a pressure ranging from 0.2 - 1000 bar

31. (New) The method of claim 30, wherein the individual carotenes are selected from the group consisting of β -carotene, α -carotene, lycopene, phytoene, and phytofluene; the individual tocopherols are selected from the group consisting of α -tocopherol, γ -tocopherol, and δ -tocopherol, and the individual sterol is β -sitosterol.

32. (New) The method of claim 30, wherein the mixture comprising squalenes, carotenes, tocopherols, and sterols is a vegetable oil.

33. (New) The method of claim 30, wherein the vegetable oil is palm oil.

34. (New) The method of claim 30, wherein the second adsorbent is selected from the group consisting of normal-phase silica gel, reversed-phase silica gel, neutral alumina, and polymer adsorbents.

35. (New) The method of claim 30, wherein the non-polar solvent for step (2) is selected from hexane, heptane, ethyl acetate, isooctane or petroleum ether.

36. The method of claim 30, wherein the polar solvent used in step (g) is selected from the group consisting of ethanol, isopropanol, methanol, butanol, ethyl acetate, and acetonitrile.